

Abstract:

Production of methane from coal seams is primarily dependent on the permeability of the coal. The present invention uses a three-step process to stimulate a coalbed methane well, wherein step one comprises injection of a predetermined gas into a well bore intersecting a coal seam, step two comprises a shut-in period and step three comprises the placement of propped fracture treatment. In step one, the injection of the predetermined gas physically opens pre-existing paths of weakness in the coal. As the predetermined gas travels along these planes of weakness, it preferentially adsorbs onto the coal and displaces the methane. This displacement process induces shrinkage of the coal matrix which further increases the size of the intervening existing fractures. The second step, or shut-in period, allows time for this gas exchange process to substantially complete, thereby maximizing the effect of matrix shrinkage and enhancement of the intervening fractures. The third step comprises placement of a propped fracture treatment into this enhanced fracture system. Propping of the enhanced fractures ensures that they remain open, even as removal of water and methane work to close the fractures by increasing effective stress within the coals. The result is a stimulated coal seam which maintains enhanced permeability during production operations.